REMARKS/ARGUMENTS

Claims 4-6, 16 and 17 have been cancelled without prejudice or disclaimer. Claim 7 has been amended. Claims 7-15 are currently pending in this application.

Claim 7 has been amended to indicate that the measured analine point ranges from 110°F to 170°F. Support for this amendment may be found on page 15, line 24 to page 16, line 4. Furthermore, claim 7 has been amended to define the VGO as having a measured analine point that is lower than a calculated analine point. Support for this amendment may be found for example on page 15, lines 10-13, and Tables 17A –17C, pages 49-53.

Rejection Under 35 U.S.C. 112

Claims 7-15 have been rejected under 35 U.S.C. 112, first paragraph. Examiner indicated that the range of the measured analine point from 110° to 150°F as defined in claim 7 was not supported by the specification at the time of filing. As stated in the last response, this range is supported in the application with reference to Table 15 on page 47, where Analine points throughout this range are disclosed. However, Applicant has further amended the range of the measured analine point to read from about 110° to about 170°F. Support for this amendment may be found on page 15, line 24 to page 16, line 4.

Removal of the rejection to claims 7-15 under 35 U.S.C. 112, first paragraph is requested.

Rejection Under 35 U.S.C. 103(a)

Examiner has rejected claims 7-15 under 35 U.S.C. 103(a) as being unpatentable over Freel et al. (U.S. Patent No. 5,792,340) in view of Chomyn (U.S. Patent No. 5,858,213) or Mosby et al. (U.S. Patent No. 5,626,741). Applicant respectfully disagrees with this rejection.

Claim 7 defines a method of producing a VGO by processing a heavy hydrocarbon feedstock in the presence of a particulate heat carrier from about 300° to about 700°C, collecting the product stream, and isolating the VGO. Applicant submits that when considered as a whole, the claimed method is not obvious in view of the cited prior art as the combination of features defined in the claim are not suggested within Chomyn, Mosby and Freel when considered alone, or in combination. Applicant also submits that the methods disclosed in either Chomyn or Mosby would not be relied upon by one of skill in the art to combine with the method of Freel as the methods of Chomyn or Mosby involve very different procedures than that of Freel: distillation in the absence of a particulate heat carrier (Chomyn or Mosby) v. pyrolysis in the presence of a particulate heat carrier (Freel). Furthermore, it is submitted that even though VGOs are known, novels methods for the production of a VGO are patentable, and the present invention describes such novel methods. These points are argued in more detail below.

Examiner is relying on Freel as disclosing a process for cracking a heavy hydrocarbon feedstock (page 3 of the Action) in a process that is similar to that being presently claimed. Examiner acknowledges that Freel does not disclose the isolation of a VGO from the liquid product, and relies upon Chomyn and Mosby for the process of isolating a VGO from a heavy hydrocarbon feedstock. Examiner states on page 4 of the Office Action that "[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to have

modified the process of Freel by separating VGO from the liquid product as taught by either Chomyn or Mosby, because such a step is capable of separating the product into more valuable product such as distillates and VGO." Applicant submits that this conclusion is incorrect and over simplifies the merits of the present invention.

Freel discloses a process to pyrolyze a carbonaceous feedstock, and a heavy hydrocarbon is listed as a type of carbonaceous feedstock that may be processed. However, no products were further processed in Freel, nor is there any suggestion that a pyrolysis product, irrespective of the feedstock used, may be further processed. There is also no teaching or suggestion in Freel, that a pyrolysis product produced using a heavy hydrocarbon feedstock may be further processed to produce a VGO fraction as defined in claim 7. Furthermore, properties of a VGO produced by this method were not disclosed or suggested. Clearly, one of skill in the art upon reading Freel would not have been lead to isolate any fraction for a product produced following rapid thermal pyrolysis, let alone a VGO fraction.

In Mosby, a process for processing a heavy hydrocarbon feedstock is described that involves passing a heated feedstock to a primary distillation tower (26, Figure 3) where volatiles (29-32), atmospheric gas (33), and a crude fraction (35) are obtained (see col 4, line 55 to col 5, line 44). The Atmospheric gas is sent to a fluid catalytic cracking unit (FCCU; Figure 1) for further processing, and the crude fraction is heated and either sent to an FCCU, or to a pipestill vacuum tower (42) for processing. If the crude fraction is sent to a pipestill vacuum tower, further fractionation occurs in the presence of steam to produce a wet gas (46), a heavy or light vaccum gas oil (48), and a crude fraction (50). The heavy or light vaccum gas oil, and the crude fraction may be further processed, for example using an FCC unit.

The process described in Mosby to produce a VGO is very different from that described in the present invention. The VGO in Mosby is obtained from a crude fraction of a heavy hydrocarbon feedstock that has been pretreated by passing through a primary distillation tower to remove volitiles and water gas, followed by fractionation within a pipestill vacuum tower. The feedstock has not been in contact with a particulate heat carrier, or upgraded in any manner as described in the present invention.

In Chomyn, a feedstock is mixed with steam and this mixture is introduced into the flash zone of a distillation tower (see col 2, line 55 to col 3, line 5). A VGO (28, 29, 31, Figure 1) is isolated from distillation of the heavy hydrocarbon feedstock and used for further processing. The VGO so produced is a distillation product. However, the feedstock has not been in contact with a particulate heat carrier, or upgraded in any manner as described in the present invention prior to the isolation of the VGO fraction.

In both Mosby and Choymn, the VGO fraction is further processed within an upflow reactor comprising a particulate heat carrier, for example a fluid catalytic cracking unit. The processing of the VGO with a particulate heat carrier occurs *after* the VGO fraction has been obtained by distillation. In the present invention, the feedstock is processed using a particulate heat carrier *before* isolation of a VGO fraction. Clearly, the method of the present invention is very different from that disclosed in either Choymn or Mosby.

Furthermore the VGO produced using the present invention exhibits unique properties. A comparison of prior art VGOs and the VGOs of the present invention is provided on page 14, line 22 to page 15, line 23, and page 54, lines 3-11 of the specification. The properties of the VGO of the present invention are different from those of the prior art for example, the calculated

analine point of a VGO of the present invention is higher than the measured analaine point of the same VGO, while for prior art VGOs, the calculated analine point correlates well with the cracking characteristics of the VGO. As explained in the identified passages of text, this difference may be due to the unique hydrocarbon profile of the VGO of the present invention that comprises a high proportion of mono-aromatic plus thiophene aromatic compounds.

The unique properties of the VGO fractions produced according to the method of the present invention were highlighted by an independent third party (see in Appendix A the report from Dennis Kowalczyk of "Refining Process Services, Inc." The dates and fax headers have been redacted from this document.). The data from this report was used in Example 6, page 46, of the present invention. In this report, in the last paragraph on page 2, it is stated that

> "[c]onversion differences for the three ... feedstocks relative to the ANS VGO was larger than anticipated based on comparison with the MAT testing results."

On page 3, top paragraph, line 6, it is noted that

> "...we estimated that the aniline point for the Athabasca, Kerrobert and hydrotreated Athabasca material would be closer to 135°F, 144°F and 168°F, respectively. Aniline points for these feeds were measured at 110°F, 119°F and 133°F, respectively."

Furthermore, on page 3, third paragraph it is stated that:

> "in our initial meeting...it was reported that the upgraded feedstocks should crack to a greater extent than would be apparent by examining the physical inspections. This appears to be the case. The hydrocarbon composition data...indicates that the upgraded feeds contain close to 38% mono-aromatics plus thiophene aromatics. These

types of molecules have significant amounts of side chains available for cracking and therefore provide higher levels of conversion and light liquid product."

This report clearly identifies that the VGOs produced according to the methods of the present invention have unique properties compared to prior art VGOs. These differences have also been highlighted within the specification on page 14, line 22 to page 15, line 23, and page 54, lines 3-11, as noted above. Even though Mosby and Chomyn disclose isolation of a VGO fraction, prior art VGOs as suggested within the attached report exhibit different properties than the VGOs of the present invention.

Mosby or Chomyn are examples of obtaining a VGO fraction from a heavy hydrocarbon feedstock. The fact that a VGO fraction can be obtained, and that it can be further processed within an FCC unit does not mean that alternate methods to produce a VGO fraction are obvious, nor does it mean that all VGO fractions are the same. To suggest that a VGO fraction obtained from a pipestill vacuum tower, or a distillation tower, renders the present invention obvious, is a gross over simplification of the processes disclosed in the present invention. Applicant submits that hindsight analysis of the present invention is required for such a conclusion to be reached. Such hindsight reasoning is permitted only if it takes into account knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure (In re McLaughlin 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971)).

There is no teaching or suggestion within Mosby or Chomyn that a VGO may be obtained from a product obtained following rapid thermal processing of a heavy hydrocarbon feedstock in the presence of a particulate heat carrier. Rather, prior to the present invention, the

use of particulate heat carriers was typically directed to cracking feedstocks for example within FCC units (as described by either Chomyn or Mosby). It was not generally known that a particulate heat carrier could be used to mildly crack and upgrade the feedstock as described in the present application and that a VGO fraction with useful properties could then be obtained. Similarly, there is no teaching or suggestion in Freel that a VGO fraction could be derived from a product obtained following rapid thermal processing, nor was there any suggestion as to what the properties of the product would be following this treatment.

Examiner states on page 5 of the Office Action that Chomyn and Mosby were relied upon to teach that it is known to separate VGO from a hydrocarbon stream, and a hydrocarbon stream is produced using the Freel process.

However, by making this suggestion, Examiner is ignoring the claim as a whole. Claim 7 is directed to a combination of elements, and the combination of elements needs to be considered in view of the prior art. When the claim as a whole is considered, it can readily be seen that Chomyn and Mosby do not teach or suggest thermal processing of a heavy hydrocarbon feedstock in the presence of a particulate heat carrier, and Freel does not teach or suggest the further processing of a product obtained from thermal processing of a feedstock, let alone obtaining a VGO fraction. One of skill in the art would not have been lead to combine these methods due to the differences in the methods used, and due to the lack of suggestion in any of the documents to combine any of the steps.

Examiner goes on to suggest (on page 5) that a product stream of Freel would comprise the VGO fraction of the present invention. However, this is irrelevant with respect to the present invention because: 1) a VGO was not isolated or characterized in any manner in Freel; 2) there

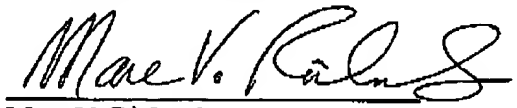
was no suggestion in Freel that such a fraction could be obtained; and 3) the existence of a fraction within a product does not automatically make the isolated fraction unpatentbable. If Examiner's logic is followed with reference to an alternate example, then an antibiotic obtained from a bacteria, or from an extract obtained from the bacteria, would not be patentable, since the bacteria "would comprise [an antibiotic] having the same properties as the [antibiotic] from the claimed process." Even though an antibiotic is a desired product, antibiotics and their methods of production are well known to be patentable, as are alternate methods for their production. Just because a product is known does not mean that alternate methods for its production are not patentable.

Furthermore, in the present case, Applicant submits that not only is the method novel, but the product produced by the method is novel and exhibits unexpectedly different properties from VGOs of the prior art. Neither Freel, Mosby, nor Chomyn provide any motivation to isolate the specific VGO fraction having the claimed properties.

Applicant submits that Freel et al., Mosby et al. and Chomyn, either alone or in combination, do not teach or suggest the combination of features as defined in claim 7, and that one of skill in the art, upon reading Freel et al., Mosby et al. and Chomyn would not have been lead to the invention as claimed in claim 7. As claims 8-15 each depend from claim 7, they include the claims limitations of claim 7, and are allowable for at least the same reasons.

Removal of the rejection to claims 7-15, under 35 U.S.C. 103(a) is respectfully requested.

Respectfully submitted,



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